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Mycetobiine Woodgnats (Diptera: Anisopodidae) from the Oligo-Miocene Amber of the Dominican Republic, and Old World Affinities

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ABSTRACT

Four new species of Anisopodidae are described from the upper Oligocene–lower Miocene amber of the Dominican Republic, Hispaniola: *Valeseguya disjuncta, Mycetobia antillea, Mycetobia cryptambra,* and *Mesochria neotropica.* The amber specimens of *Mycetobia* Meigen represent the first record of the genus for the Greater Antilles. A remarkable amber piece contains 2 pupal exuviae and an adult female of an unidentified *Mycetobia* species; the pupae are typical of living *Mycetobia.* Most intriguing are the fossil species of *Valeseguya* Colless and *Mesochria* Enderlein. The extant genus *Valeseguya* is known from a single male from Victoria, Australia; the fossil species is represented by 25 males and females. Females have an "ovipositor" unique for the Diptera, which is very thin, elongate, and presumably modified from the cercus and hypoproctal valves. *Mesochria* is entirely Old World tropical (Africa, Seychelles, Borneo, New Guinea, and Samoa). The amber species shares some apomorphies specifically with *Mesochria intermedia* from Borneo, but it may also be the sister group to living *Mesochria* species. Unlike all living *Mesochria,* the amber species does not have holoptic eyes in the female. Extensive geographical extinction probably accounts for the disjunct distributions.

INTRODUCTION

The large amber deposits from the Dominican Republic are becoming renowned within entomology, for the preservation quality of the inclusions, the taxonomic diversity, and for some startling biogeographic implications. Some taxa otherwise absent from the Antilles have been found in Dominican amber, indicating their geographical

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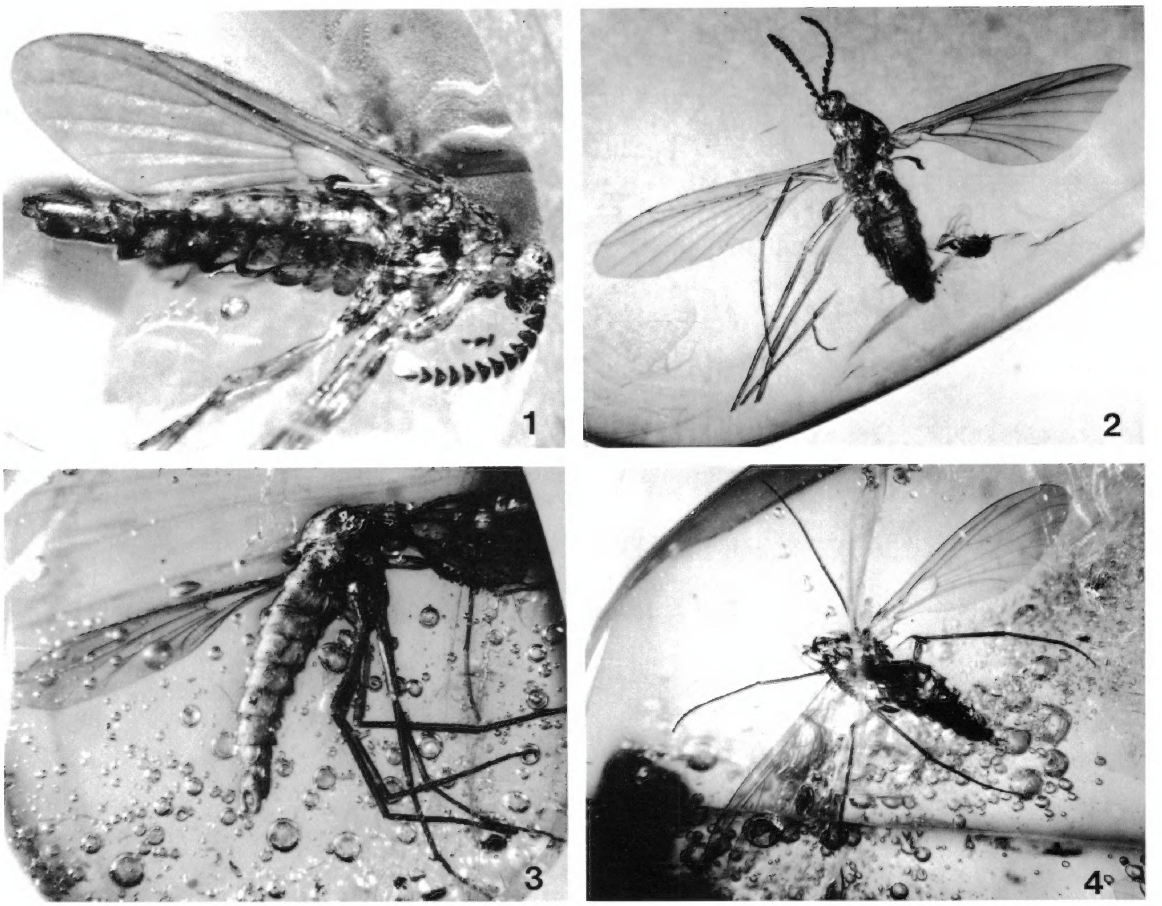
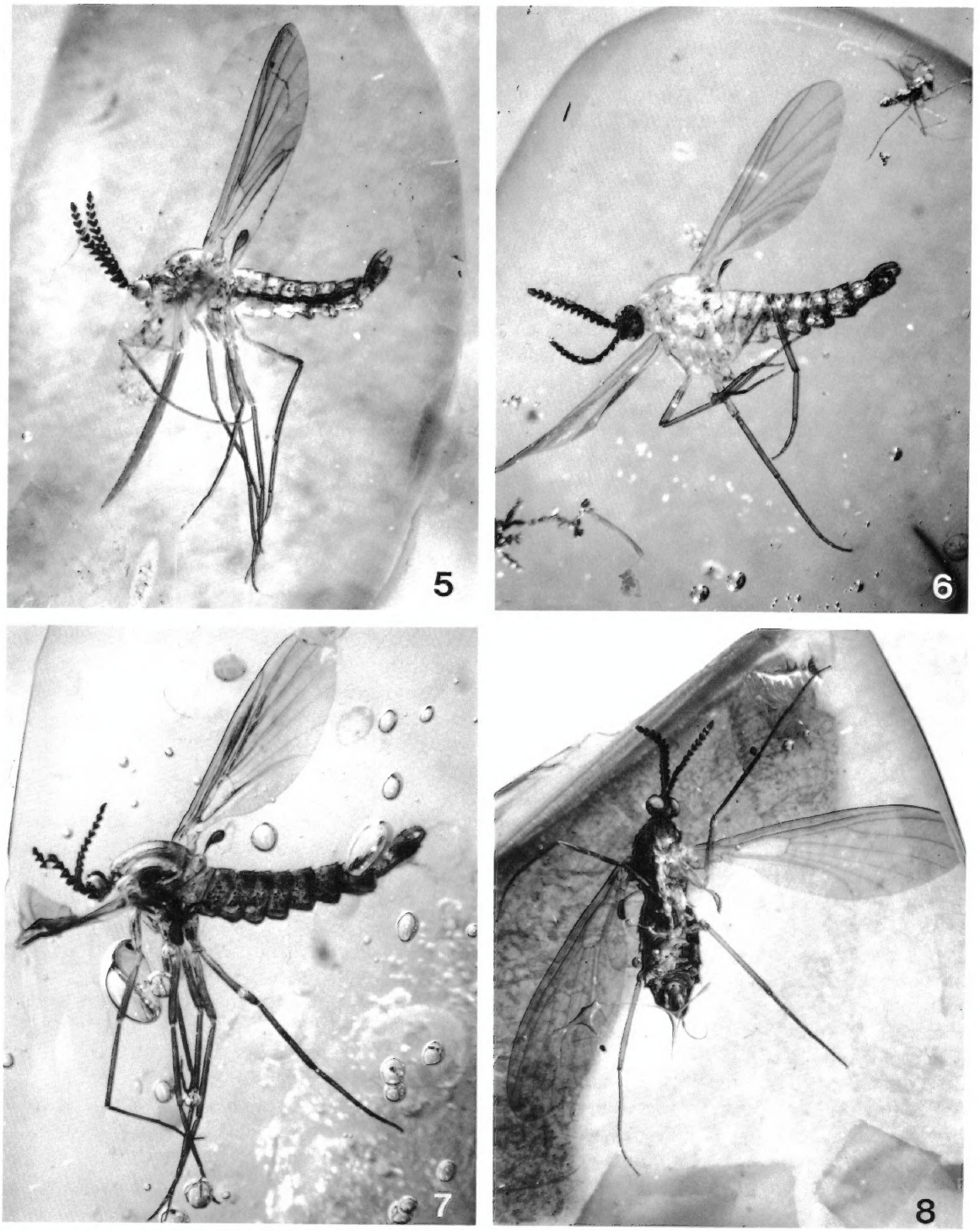


Figs. 1–4. *Valeseguya disjuncta,* new species. **1.** AMNH 11655 (paratype male). **2.** AMNH 21112 (paratype male). **3.** AMNH 11652 (paratype male). **4.** AMNH W-DR-44 (paratype female).

extinction. For example, the amber fossil *Trigona dominicana* is apparently the only stingless bee known from the Caribbean (a possible Cuban introduction being the single exception; Michener, 1982). The meliponine bees are widespread and speciose throughout the circumtropical area, including Central America. Ants in the genus *Leptomyrmex* are restricted to the Indo-Pacific, the one exception being a Dominican amber species (Baroni-Urbani and Wilson, 1987). Perhaps the most obvious and striking instance of geographical extinction is an undescribed species of *Mastotermes* (Isoptera) from Dominican amber (Krishna and Grimaldi, 1991); this genus is represented by one living species in Australia. Other examples are the new species of *Valeseguya* and *Mesochria* described here. The closest relative of *Valeseguya disjuncta* is represented by a single extant male from Australia (Colless, 1990); *Mesochria* is an Old World tropical genus. Thus, biogeographic affinities of the Dominican amber fauna are rather varied. A preponderance of examples indicates relationships to the living Caribbean and Central American entomofaunas, but clearly there are some relict affinities with the Indo-Pacific as well.

Habits and life histories of the mycetobiines indicate that there is a likelihood of amber fossilization. These wood gnats are found in mature forests or are otherwise associated with wounded trees. Teskey (1976) reported that larvae of *Mycetobia divergens* were commonly collected in fermenting sap of wounds from various trees in Canada. Ashe (1988) reported *Mycetobia obscura* Mamaev breeding in the wet detritus in rot holes of living oak (*Quercus*) trees in Ireland. This species was also reared, from damp decayed



Figs. 5–8. *Valeseguya disjuncta,* new species. **5.** AMNH 11653 (paratype). **6.** AMNH 21111 (paratype). 7. AMNH 11315 (holotype male). **8.** AMNH 21110 (paratype female).

tree stumps, by Mamaev (1968) near Moscow, USSR. *Mycetobia pallipes* Meigen has been reared from tree sap fluxes in England (Peter Chandler, personal commun. 1990). One pupa of *Mesochria* was reared from "rotting banana fibre" in Africa (Keilin and Tate, 1940).

Unfortunately, the stratigraphic study of amber from the Dominican Republic is not good, and references to its age vary from the Oligocene, Miocene, and even the Eocene. The best review of Dominican amber stratigraphy is by Schlee (1984). Lambert et al. (1985) estimated a range in age of 15 (middle Miocene) to 40 million (upper Eocene) years. Their hypothesis is based on a presumed rate of decay of an exomethylene radical in the amber, extrapolated using the only stratigraphic date known, from the Palo Alto mine. It should be noted that their youngest age is considerably older than that postulated by Weller and Wert (*in* Schlee, 1984), who indicated that amber from Cotui in the Dominican Republic is copal and therefore quite young, perhaps only one million years old. Amber from Cotui is indeed much more recent than the other amber deposits, and very distinct for its softness and clear color. Pending a thorough stratigraphic analysis of Dominican amber, it is most prudent to assume a lower Miocene-upper Oligocene origin of amber from localities other than Cotui.

Fossil Anisopodidae are most abundant in the Baltic amber, all of which were described by Meunier (1899). I have not examined the Meunier types, but Edwards (1928b) placed *Mycetobia callida* Meunier as a junior synonym of *Mycetobia connexa* Meunier, and indicated that the remaining species of Meunier were unrecognizable or doubtfully in *Mycetobia*. Hurd et al. (1962), and McAlpine and Martin (1969) mentioned that undescribed anisopodids occur, respectively, in the Oligo-Miocene amber of Chiapas, Mexico, and Cretaceous amber of Canada.

MATERIALS, METHODS, ACKNOWLEDGMENTS

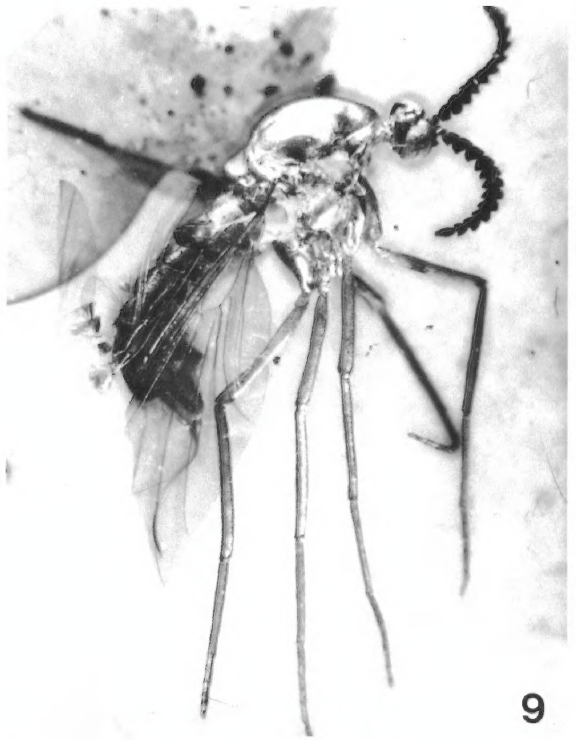
Most of the amber specimens used here were purchased from Mr. Jacob Brodzinsky, Santo Domingo, Dominican Republic. Their exact provenance is unknown, but based on information from the amber workers with whom he works, the locations can be narrowed down to a mining vicinity. These localities are given for each specimen, although not all specimens have been assigned a possible provenance (table 1). Other specimens were purchased by Mr. Jörg Wunderlich, who originally acquired them in Santiago, which is the major amber dealing center of the Dominican Republic. Specimens were prepared by cutting them at the appropriate angle with a small circular emory wheel, grinding by hand on Super Fine grade (004) silicon carbide paper with some surface water, and polishing with a small cotton-knapped wheel using Buehler Alpha Alumina micropolish no. 1 (5.0 micron). Specimens were examined by immersing them in a 1:1 mixture of pure mineral oil and soy oil, using fiber optic reflected and incandescent transmitted light. This procedure was also used for photography.

I thank Ms. Linda Krause for help in the specimen preparation, Dick Vockeroth and Monty Wood for initial discussions on the family position of *Valeseguya disjuncta* and for reviewing this manuscript, and to Jake Brodzinsky for his diligent assistance. I am grateful to Don Colless for discussions and providing me with a copy of his unpublished manuscript. Mr. Julian Stark, Scientific Assistant (AMNH), provided translation of original German descriptions and was of general assistance in ways too numerous to detail. Don Colless, Peter Chandler, Neal Evenhuis, Loïc Matile, Bob Peterson, and David Yeates provided many helpful comments on the manuscript, for which I am very grateful. Hopefully the following descriptions will be complete enough to place the taxa within a phylogenetic analysis of the six extant genera.

Ms. Allma Edwards typed the tables and helped with many aspects of layout. Mr. Edward Bridges produced the fine photographs of all the specimens.

SYSTEMATICS

The subfamily Mycetobiinae (*Mycetobia* and *Mesochria*) is given family rank by Mamaev (1968), Mamaev and Krivosheina (1988), and by Baylac and Matile (1988). The first two of these papers present no justifi-



Figs. 9, 10. Specimen AMNH 11790, *Valeseguya disjuncta,* new species, female paratype. **9.** Right lateral habitus. **10.** Detail of "ovipositor."

cation for excluding the mycetobiines from the Anisopodidae, and the latter paper uses primarily fossil (minimum absolute age) data. The lower Tertiary and Cretaceous fossil evidence is quite scanty for these flies, and Baylac and Matile (1988) also cited some tenuous synapomorphies and symplesiomorphies that have traditionally been used to diagnosis the Anisopodidae, including mycetobiines. They also reviewed the history of classification of the Mycetobiinae. Until a cladisitic analysis indicates that the present composition of the Anisopodidae is polyphyletic, I will adopt the conservative definition of the family. Wood and Borkent (1989) provided no synapomorphy for the Anisopodidae (in contrast to other Nematocera families), and it is quite likely that the family is not monophyletic if the mycetobiines are included in it. Most important for the purposes of this paper is that agreement is widespread on the monophyly of the Mycetobiinae/Mycetobiidae, based on at least the possession of a single, large basal wing cell (bordered by R_1, R_2, r-m, and CuA_2); and veins R_1 and R_{2+3} strongly convergent or even coalesced apically.

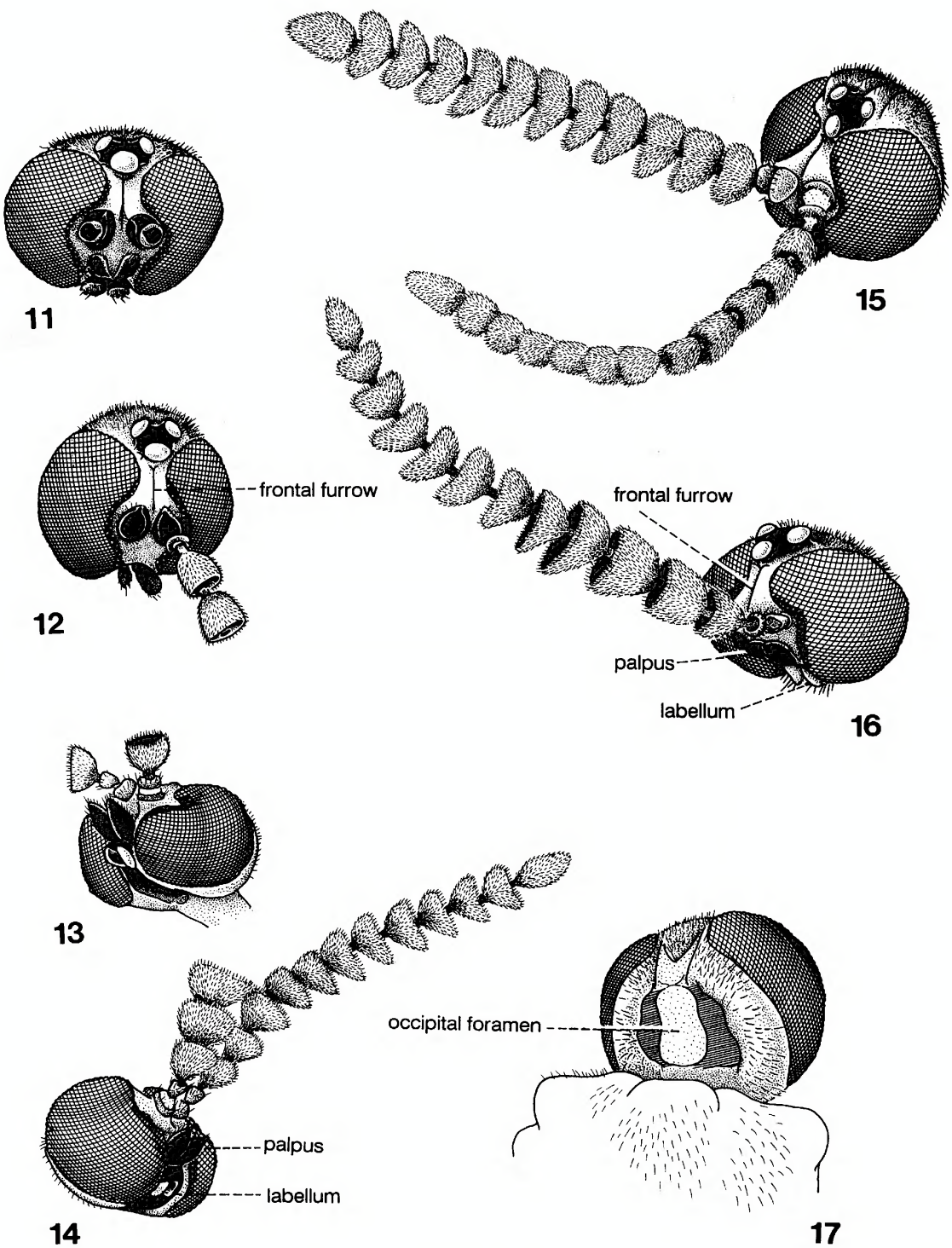
GENUS *VALESEGUYA* COLLESS

Valeseguya Colless, 1990: 351. Monotypic.
Type species: *Valeseguya rieki* Colless, 1990: 351.
Type locality: Victoria, Australia (recent).

Valeseguya disjuncta, new species
Figures 1–25

DIAGNOSIS: Antenna strongly pectinate in both sexes; proboscis vestigial, palpus protruding from oral margin; spurs absent from apices of tibiae; wing with single, large basal (no discal) cell; vein R_1 long, reaching almost to ⅔ wing length; M_1, M_2, CuA_1, and CuA_2 arising directly from basal cell, but separate; anal fold present, but without anal veins; female with distinctive ovipositor that is very long, thin, and separated into dorsal and ventral valves, and each with minutely bifid apex. In Oligo-Miocene amber of the Dominican Republic.

DESCRIPTION: *Head:* Antenna strongly pectinate; with 12 flagellomeres, each approximately triangular in lateral (broadest) view, becoming slightly shorter apicad; apical flagellomere almost oval, with tip narrowed.



Figs. 11–17. Detail of heads of paratype specimens of *Valeseguya disjuncta,* new species. **11.** AMNH 11313, male, frontal view. **12.** AMNH 11655, male, frontal view. **13.** AMNH 11790, male, oblique ventrolateral view. **14.** AMNH 21110 (sex unknown), oblique ventrolateral view. **15.** AMNH 21112, male, oblique dorsolateral view. **16.** AMNH 11653, male, oblique frontal view. **17.** AMNH W-DR-64, male, posterior view.

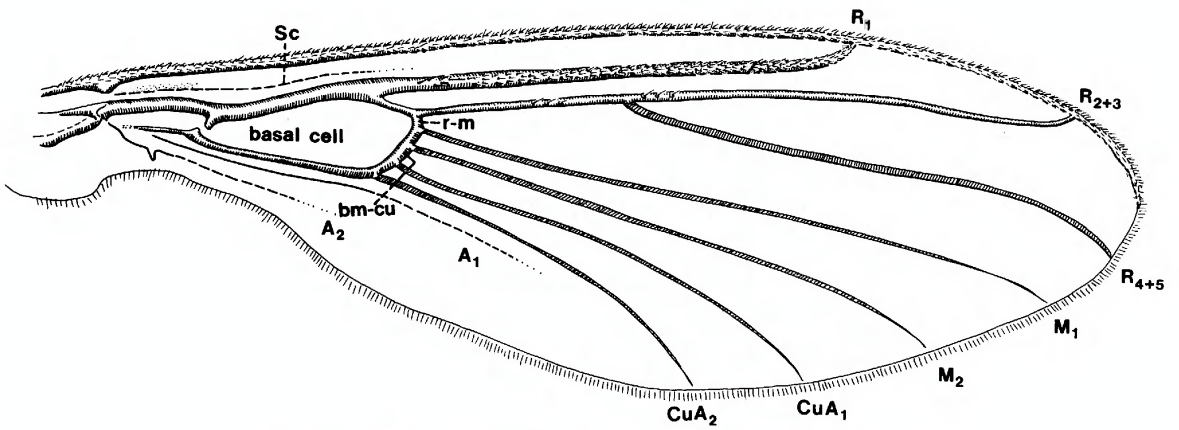


Fig. 18. Wing of paratype specimen AMNH W-DR-44.

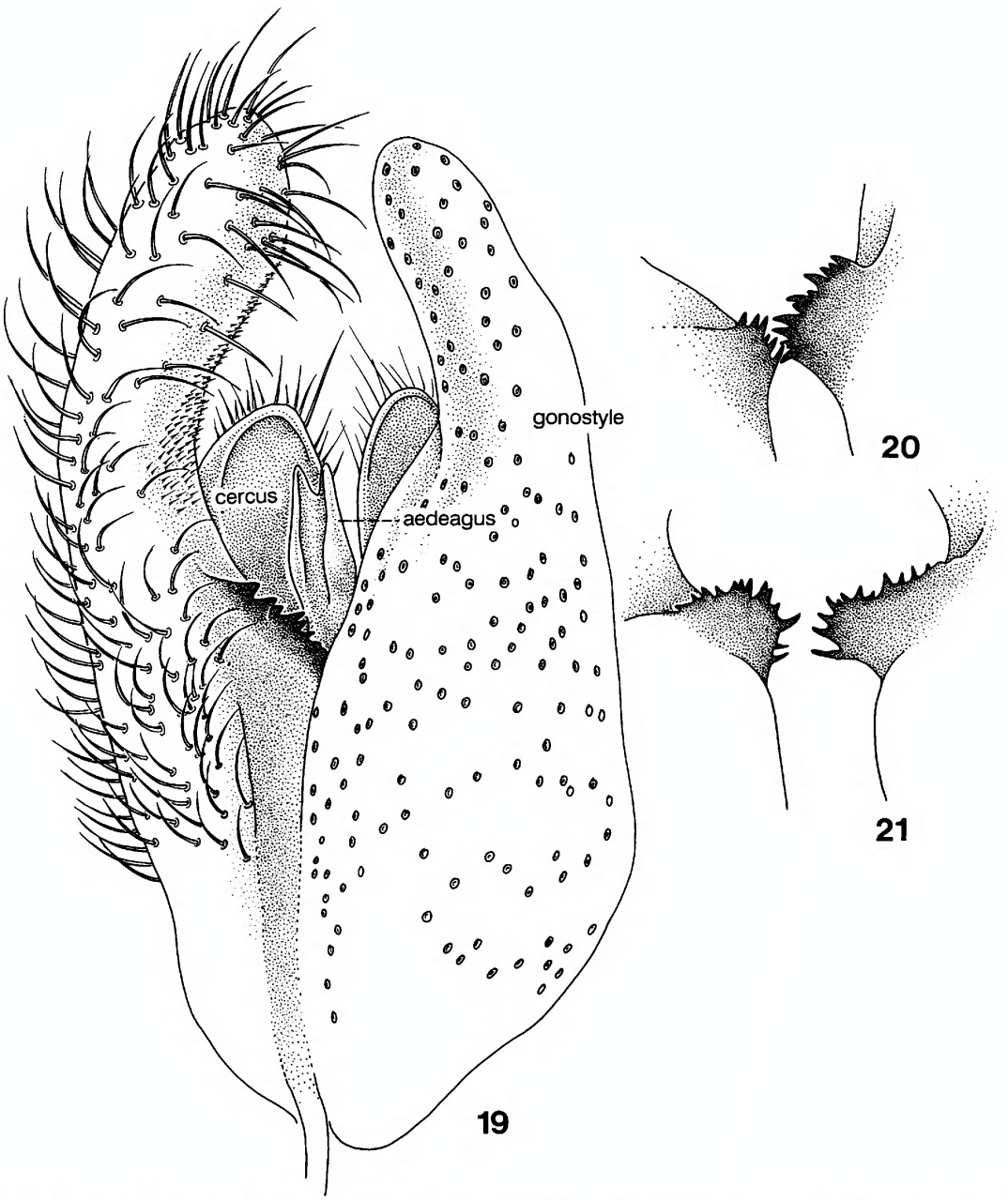
Dorsal and ventral lobes of flagellomeres not symmetrical: ventral lobe slightly longer than dorsal lobe. Scape and pedicel each with ring of fine setulae in a single row. All three ocelli large, of equal size; diameter approximately equal to that of scape. Vertex covered with short, stiff, black setulae. Eye bare, not holoptic in male, but dorsally separated by approximately width of ocellus. Eye large, occupying almost entire lateral part of head; frontal margin concave, extended around base of antenna. Ventral margin of eye extended close to lateral oral margin and separated by distance approximately equal to width of palpus. Facets on frontal margin of eye more distant from each other than elsewhere. Proboscis vestigial; palpus black, protruding well beyond oral margin. Labellum present, but very tiny, at least half the size of palpus. No remnants of clypeus apparent. Frons with median suture or furrow running from anterior ocellus to slightly beyond dorsal margin of scape.

Thorax: Mesonotum and scutellum with even covering of acrostichal setulae, irregularly arranged. Postpronotal lobe dorsoventrally flat, long, almost flangelike, with row of fine setulae on ridge. Mesonotum and pleuron dark to light brown. Coxa long, slightly longer than ½ length of femur. Femur slightly shorter than tibia. All legs with five tarsomeres. Relative lengths of tarsomeres as follows: tarsomere 1 about 3× length of t-2; t-3 slightly longer than t-2; t-4 and t-5 equal, slightly shorter than t-3 (see table 2). No apical spurs on tibiae. Legs without large, bristlelike setae, microtrichiae only, arranged randomly and evenly, not in rows. Pleuron and coxae entirely devoid of setulae.

TABLE 1
Specimens of *Valeseguya disjuncta* in Dominican Amber

AMNH specimen	Sex	DR locality	Comments
11790	F	unknown	
11804	M	La Toca	body cleared, transparent
W-Dr-64	M	unknown	
11655	M	Santiago area	
11316	M	La Toca	
11313	M	La Toca	
11654	M	Santiago area	
11781	3M	unknown	
21110	F	El Valle	
11653	M	unknown	
21111	?	El Valle	genitalia missing
21112	M	El Valle	
11780	M	unknown	
11312	F	La Toca	
W-DR-44	F	unknown	
11772	M	unknown	
11652	M	unknown	
W-DR-66	F	unknown	
11315	M	La Toca	
11314	2M	La Toca	1 male pyritized
11885	F	Santiago area	
11886	M	Santiago area	specimen cleared

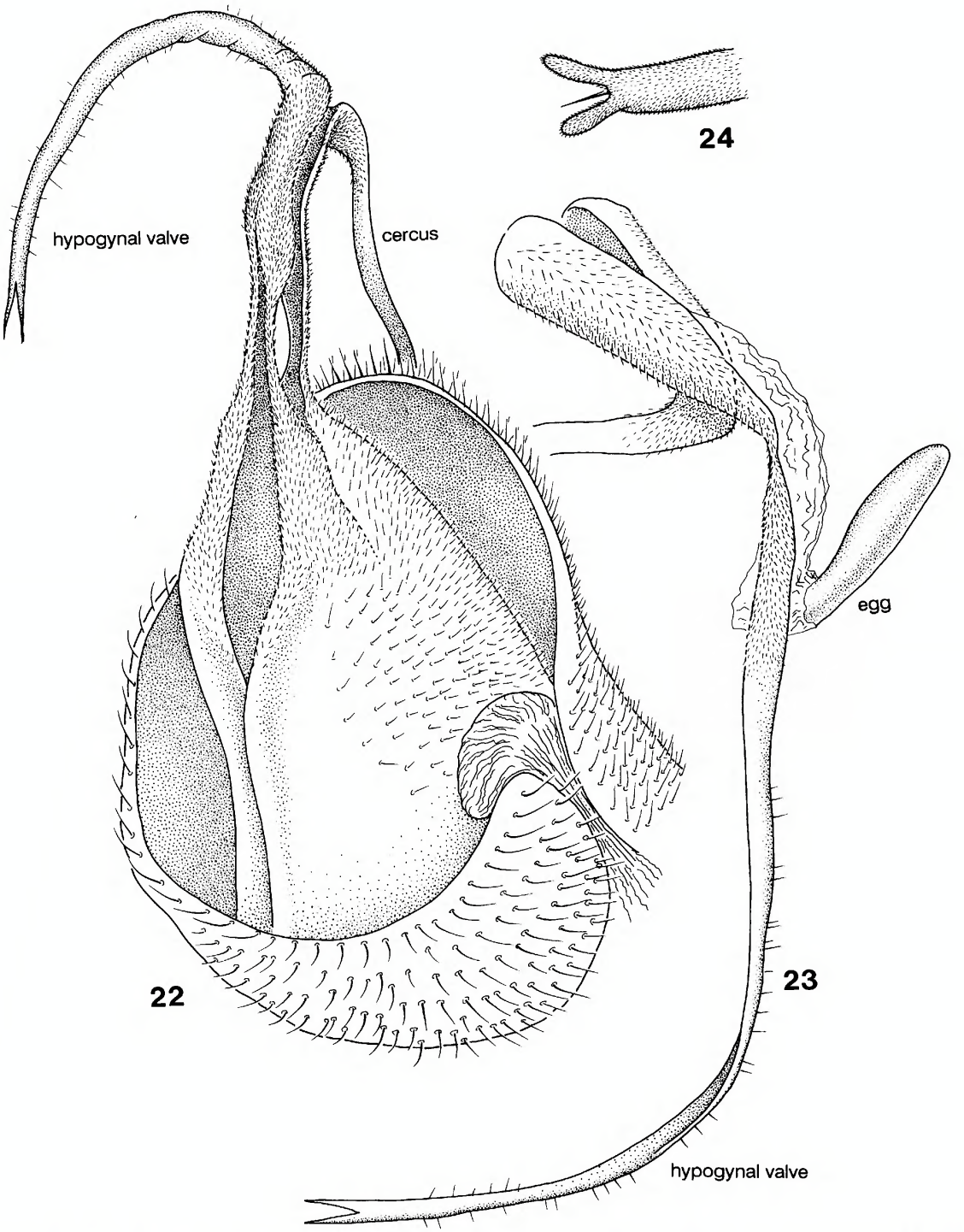
Wing: Color slightly dusky, with dense, minute microtrichia only (no macrotrichia), arranged randomly. Wing slightly longer than body. Venation unique in Diptera: Costa ending midway between apices of R_{2+3} and R_{4+5}; Sc short, ending free; vein R_1 long, reaching to ⅔ or slightly more the wing length;



Figs. 19–21. Male genitalic structures of paratype specimens of *Valeseguya disjuncta,* new species. **19.** AMNH 11866, dorsal view. **20.** Toothed gonostylar lobes in AMNH 11780. **21.** Ibid., AMNH 11804.

R_{2+3} and R_{4+5} forked, base slightly longer than ½ length of fork. Vein R_1 about twice as thick as posterior veins, with fine setulae along 4/5 its length on dorsal surface, becoming more dense and numerous apicad. Fine setulae either in one row (rarely) or randomly arranged. Costa slightly thicker than R_1, with dense fine setulae randomly arranged. Large b-r-m cell present, M_1, M_2, CuA_1, and CuA_2 connected directly to cell, no forks. Anal vein present as fold only; anal lobe absent. Halter long, with stem about same length as knob, evenly covered with stiff, short black setulae, particularly on knob. Knob dark brown, stem light.

Abdomen: Uniformly light brown, with even covering of short black setulae. Setulae present on pleural membrane, but apparently



Figs. 22–24. Female genitalia of paratype specimens of *Valeseguya disjuncta*, new species. **22.** AMNH 21110, ventral view. **23.** AMNH 11885, showing ventral valve and extruded egg. **24.** Detail of tip of dorsal valve (cercus?) of AMNH 11885.

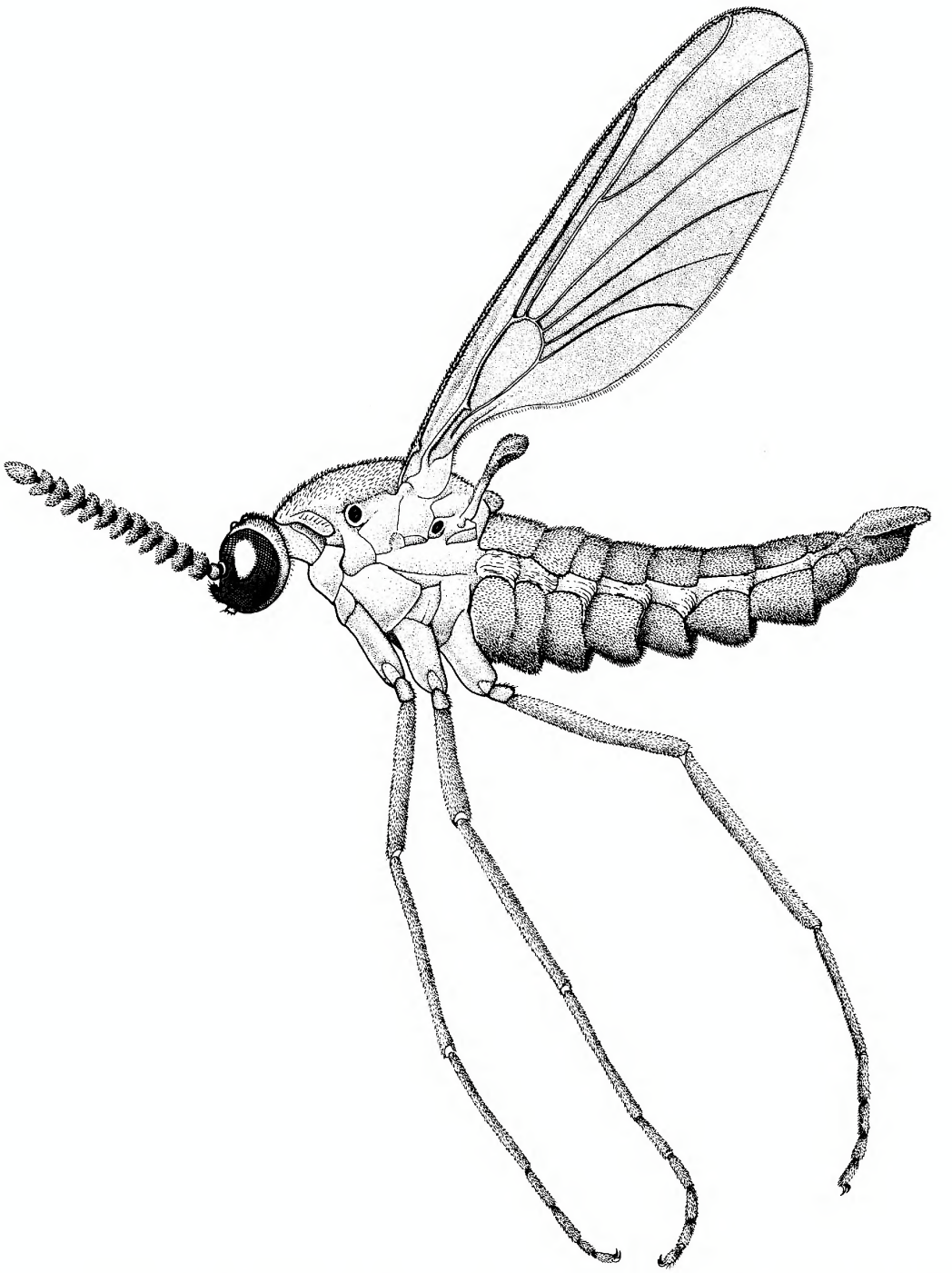
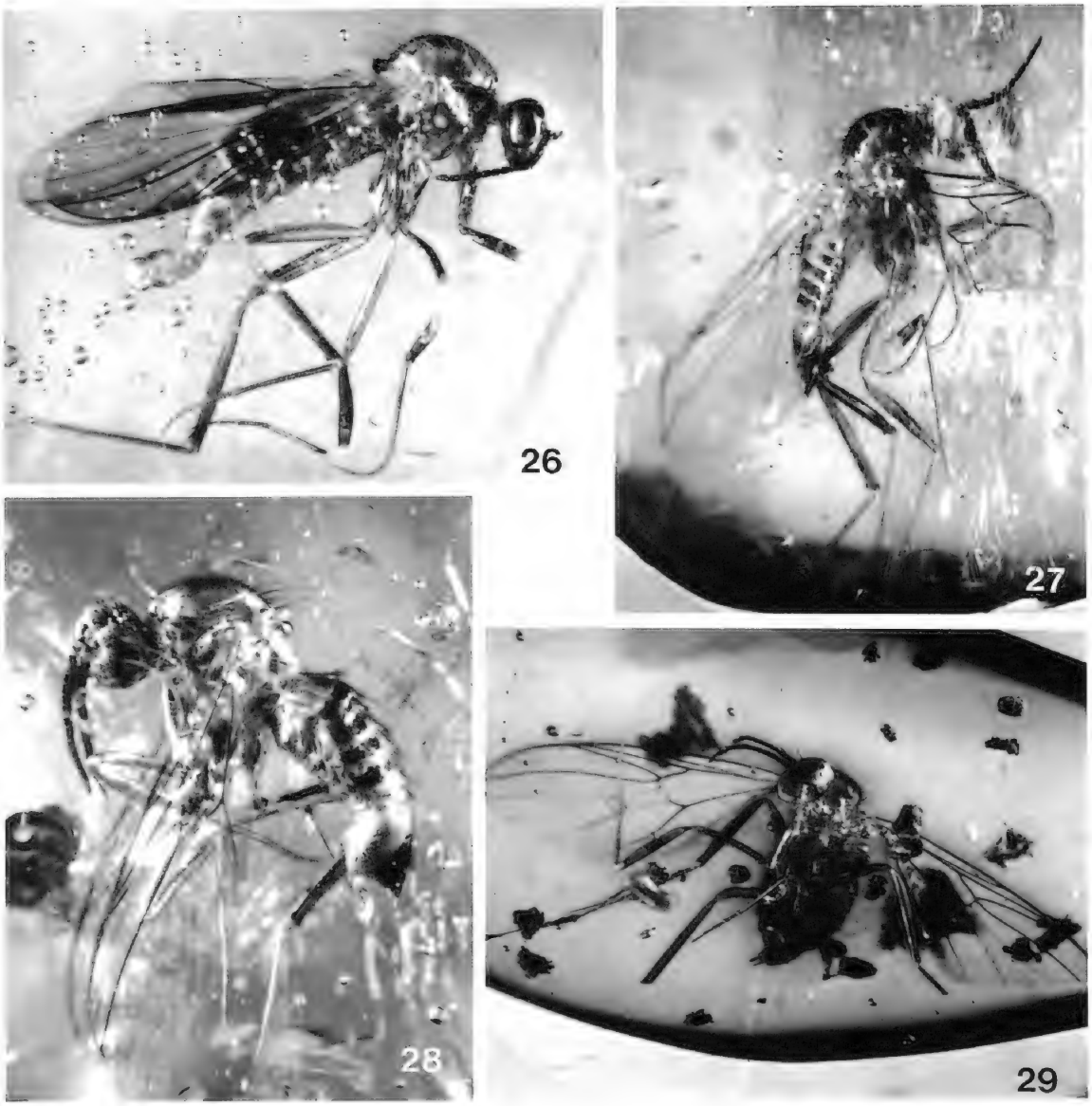


Fig. 25. Reconstructed lateral (left) habitus of male *Valeseguya disjuncta,* new species. Total body length = 6.8 mm.

light-colored and finer. Female genitalia with segment (VIII?) tubular, protruberant from segment (VII?). Arising out of apex of segment (VIII?) is a long, thin "ovipositor." Base of "ovipositor" is bulbous, with microtrichia, abruptly tapered to stylelike portion slightly longer than twice the length of basal bulb. Style consists of two "valves," apparently



Figs. 26–29. Photographs of *Mycetobia* in Dominican amber. 26, 27: *M. antillea*. **26.** Female paratype, AMNH DR-11, right lateral. **27.** Male holotype, AMNH DR-2-13, right lateral. 28, 29: *M. cryptambra*. **28.** Male holotype, AMNH 11777, left lateral. **29.** Female paratype, AMNH 11311, oblique ventral.

separated proximally to basal bulb. Each valve with a minute apical bifurcation; tips of dorsal bifurcation lobate and setose, ventral one pointed. Opposing surfaces of valves with longitudinal furrow. Fine stylet apparently occurs within ventral valve. Ventral valve apparently an elongate hypopygnial valve (sensu Peterson, 1981); dorsal valve is cercus. Male genitalia simple and plesiomorphic: with flat, lobate cerci; cylindrical, simple gonocoxites; membranous, trowel-like aedeagus/aedeagal guide; pair of sclerotized, flat, dentate lobes on anteromesal margin of gonocoxites (gonostyli?).

MEASUREMENTS: Body length (head to apex, in mm): males, mean of 5.0 (3.57–6.25, N = 8); females, mean of 4.24 (4.39, 4.09). Wing length: males, mean of 4.90 (4.39–5.59, N = 8); females, mean of 5.50 (5.14–5.84, N = 4). See table 2.

HOLOTYPE: Male, AMNH 11315 (fig. 7).

MATERIAL EXAMINED: 24 paratype speci-

TABLE 2
Length Measurements of *Valeseguya disjuncta*, n. sp. (in mm)

AMNH Specimen	Sex	Wing	Halter	Thorax	HIND LEG: Coxa	Femur	Tibia	Tarsomere: 1	2	3	4	5	Total Body	Others
11315	M	4.54	0.85	1.78	0.56	1.41	1.69	1.08	0.34	0.27	0.16	0.19	6.25	–
11652	M	5.30	1.02	1.72	–	1.47	1.93	1.24	–	–	–	–	5.83	–
11653	M	5.01	0.96	–	–	–	1.67	0.99	0.30	0.24	0.17	0.17	4.27	2.02[a]
11655	M	4.39	–	1.49	–	–	–	–	–	–	–	–	3.57	–
21110	F	5.76	0.90	–	–	–	1.90	1.21	0.37	0.27	0.17	0.21	4.39	1.74[a]
21111	M	4.59	0.80	1.67	0.69	1.55	1.53	0.93	0.30	0.26	0.16	0.22	5.45	1.90[a]
21112	?	5.32	0.91	1.58	–	1.46	1.86	–	–	–	–	–	4.73	1.65[a]
11790	F	–	0.89	1.71	0.53	1.27	1.63	0.92	0.28	–	–	–	4.09	–
11866a	M	4.60	0.89	–	–	–	1.66	0.96	0.33	0.26	0.19	0.22	5.18	1.89[a]
11804	M	–	–	–	–	–	2.03	1.26	0.37	0.28	0.18	0.19	–	–
11316	M	–	0.67	1.32	–	–	–	–	–	–	–	–	4.03	–
11313	M	5.01	–	–	–	–	1.46	1.24	0.42	0.34	0.24	0.27	–	–
11885	M	5.76	1.11	–	–	–	1.99	1.16	0.38	0.30	0.17	–	–	–
11312	F	5.14	0.83	–	–	1.44	1.76	1.10	0.34	0.26	0.17	0.18	–	1.63[o]
11772	M	5.45	–	–	–	–	1.76	1.24	0.38	0.25	0.20	0.22	5.96	1.97[a]
11780	M	4.49	–	–	–	1.32	1.72	1.07	0.34	0.27	0.17	0.18	–	–
W-DR44	F	5.26	–	–	–	–	1.82	1.14	0.32	0.26	0.18	0.19	–	–
W-DR66	F	5.84	–	–	–	–	1.90	1.16	0.35	0.29	0.16	0.17	–	–

a antenna
o ovipositor

TABLE 3
Length Measurements of Fossil Mycetobiines (in mm)

AMNH Specimen	Sex	Wing	Thorax	HIND LEG: Femur	Tibia	Tarsomere: 1	2	3	4	5	Antenna	Total Body
					Mycetobia							
11777	M	3.68	1.14	–	1.00	0.26	0.17	0.15	0.18	–	1.34	3.24
11311	F	4.42	1.47	–	–	–	–	–	–	–	–	–
DR-11	F	4.17	1.35	1.30	1.67	–	0.34	0.21	0.14	0.18	–	3.69
DR-2-13	M	–	0.97	1.15	1.26	1.08	–	–	–	–	1.34	3.54
W-DR65	F	–	–	–	–	–	–	–	–	–	–	4.87
					Mesochria							
DR-5-15	F	3.11	–	1.12	1.21	0.72	0.26	0.17	0.13	0.15	–	3.43

mens, in 21 pieces of Dominican amber, deposited in AMNH. Numbers, sexes, and localities are shown in table 1. At least one additional male specimen exists, in the collection of the Smithsonian Institution, Washington, D.C. A photograph of this specimen appeared in Davis, 1989: fig. 11, and was erroneously identified as a keroplatine mycetophilid. Other specimens of the species may exist in the large Dominican amber collection in Washington, but the series treated here is probably the largest in existence.

ETYMOLOGY: Specific epithet referring to the geographical disjunction between the only known living species and the amber species.

DISCUSSION: There is no doubt about the close relationship between the extinct (Dominican) and living (Australian) species. Synapomorphies include the eye developed ventrad; large ocelli on a conspicuously raised area; vestigial labellum; lack of any large setae over the body, including bristles and spurs on the legs; lack of an empodium or pulvillus on the pretarsi; a large halter; very distinctive wing venation with a single, large basal cell from which all the medial and cubital veins arise directly (no forks); virtual loss of anal veins, and the setation of vein R_{2+3}. Differences between *V. rieki* and *V. disjuncta* as follows: eye extended more ventrad in *V. rieki*; antenna not pectinate in *rieki*; palus reduced (well developed in *disjuncta*); medial vein spur within the apical portion of the basal cell (no spur in *disjuncta*); R_1 incomplete, and stem of R_{2+3} and R_{4+5} much shorter than lengths of the fork; and male cerci much larger than gonocoxites in *rieki*. It is important to note that Colless and I differ in our interpretation of certain vein homologies: M_1 in this paper is M_{1+2} in Colless (1990), M_2 here is M_3, CuA_1 is M_4, and CuA_2 is CuA_1 to Colless. In many respects the fossil species is more modified than the living species.

Relationships of *Valeseguya* are obscure because of the numerous highly modified features. The genus lacks a discal wing cell, which may be a derived character for the Anisopodinae. However, both species of *Valeseguya* have also lost the empodia and pulvilli, which are well developed in this subfamily. If the genus is to be placed in the Mycetobiinae, then it would require the following transformations from the ground-plan wing venation of the subfamily: veins M_1 and M_2 do not have a common base, but have each become connected directly to the large basal cell; there is a loss of the fold in the basal wing cell; the anal veins and anal fold have been lost. The large basal cell is a derived feature shared with the mycetobiines, but this also occurs in the Ditomyiinae and Keroplatinae (Mycetophilidae), presumably convergently. Colless (1990) maintained that vein M_2 was lost in the fork of M_{1+2}, and this was based on an undescribed species of *Mesochria* from New Guinea with a reduction of "M_2" intermediate between other *Mesochria* and *Valeseguya*.

Despite the fact that the most reasonable wing vein transformations derive from the mycetobiines, there are two features of this genus shared only with *Olbiogaster* (Anisopodinae). These are: the lack of large setae (bristles) over the body (only an even covering of fine setulae is present); and the relatively long antennae (more than four times the length of the head, but three times the length of the head or shorter in other genera). But here the similarities between these two genera end. Colless (1990) likewise deferred the genus to the mycetobiines, but also felt that it might be the sister group to *Mesochria*. I believe a sister-group relationship between *Mesochria* and *Mycetobia* is probable, as discussed below. It is possible that *Valeseguya* represents a new subfamily of the Anisopodidae. In lieu of a world revision of the anisopodid genera, *Valeseguya* is kept in the Mycetobiinae.

GENUS *MYCETOBIA* MEIGEN

Mycetobia Meigen, 1818: 229.
Type species: *Mycetobia pallipes* Meigen, 1818, as designated by Westwood, 1840: 127.

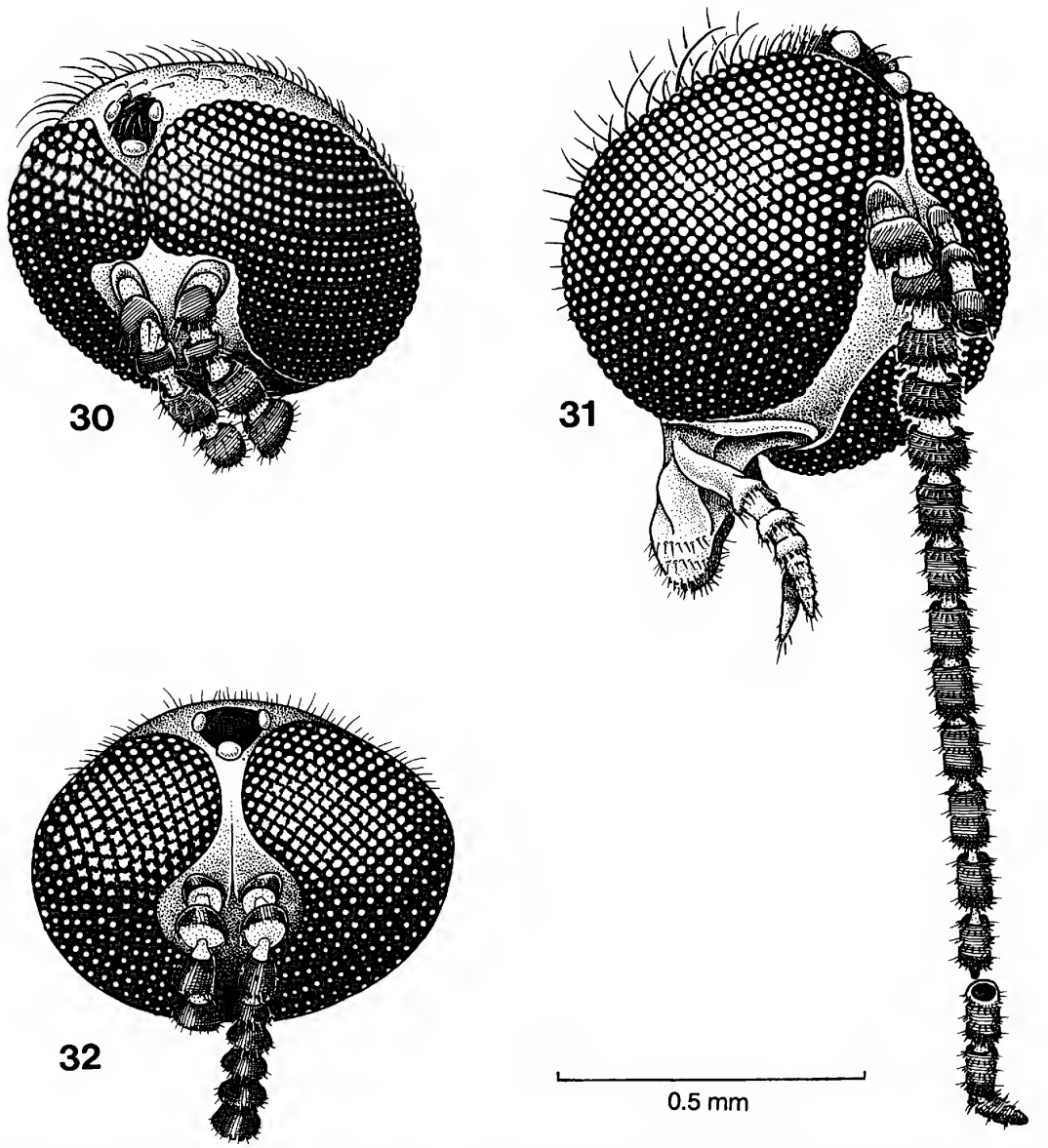
Mycetobia antillea, new species

Figures 33, 35, 38, 40

DIAGNOSIS: Mesonotum dark brown, body otherwise mostly evenly yellowish. Male genitalia with epandrium entirely dark brown on posterior half; no median lobe on ventral, terminal membranous flap; anal point (aedeagal guide) extended well beyond epandrial lobes.

DESCRIPTION: *Head:* Antenna dark brown to black, with 14 flagellomeres; with two to three rings of short setulae. Last flagellomere conical, about twice the length of penultimate segment. Eyes dorsally contiguous in male, occupying most of head in lateral view in both sexes. Palpus and proboscis light.

Thorax: Katepisternum dark brown, rest of pleuron yellow, including coxa. Holotype with row of four long supra-alar setae. Pronotum without obvious patch of long setae on lateral lobe. One pair intrapostalar setae; three long postalar setae on postalar callus,



Figs. 30–32. Heads of *Mycetobia* and *Mesochria*. **30.** *Mycetobia cryptambra,* male holotype, AMNH 11777. **31.** *Mycetobia cryptambra,* female paratype, AMNH 11311. Left antenna omitted. **32.** *Mesochria neotropica,* female holotype, AMNH DR-5-15.

median one twice the length of others. Mesonotum dark brown, diffusing to yellow near notopleural edge. Scutellum and postnotum dark brown. Halter yellow; knob almost round; stem short. Wing hyaline, with veins C, Sc, R_1, R_{2+3}, R_{4+5} and basal portion of CuA thick and dark. Veins M_1, M_2, CuA, and crossvein bm-cu thin, hardly darkened. Costa extended to slightly past R_{4+5} by a distance about twice the thickness of costal vein. R_1 and R_{2+3} convergent to within a distance of about the width of the veins, but not touching apically. Wing membrane with dense, even covering of microtrichia, no macrotrichia. Costa with three longitudinal rows fine microtrichia. Veins Sc, R_1, R_{2+3}, R_{4+5}, with row of microtrichia along dorsal and ventral surfaces. r-m crossvein not connected to base of R_{4+5}. CuA_2 with six to seven microtrichia near base. Basal cell with median fold. Fork of M_1 and M_2 equal to length of stem of M. M_1 not connected to M_2, narrowly separated.

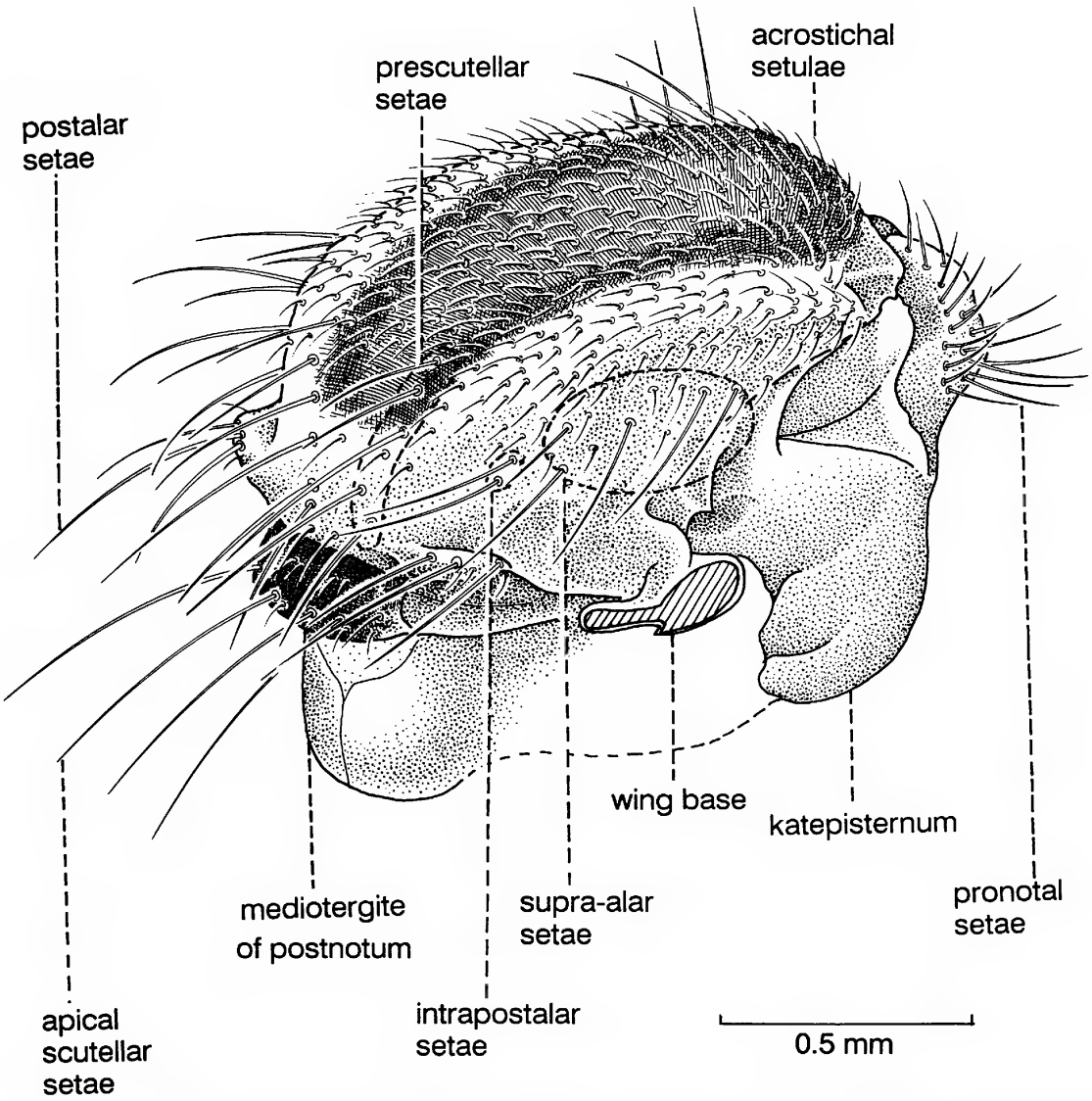


Fig. 33. Thorax, right posterolateral view, of AMNH DR-11, paratype female of *Mycetobia antillea,* new species.

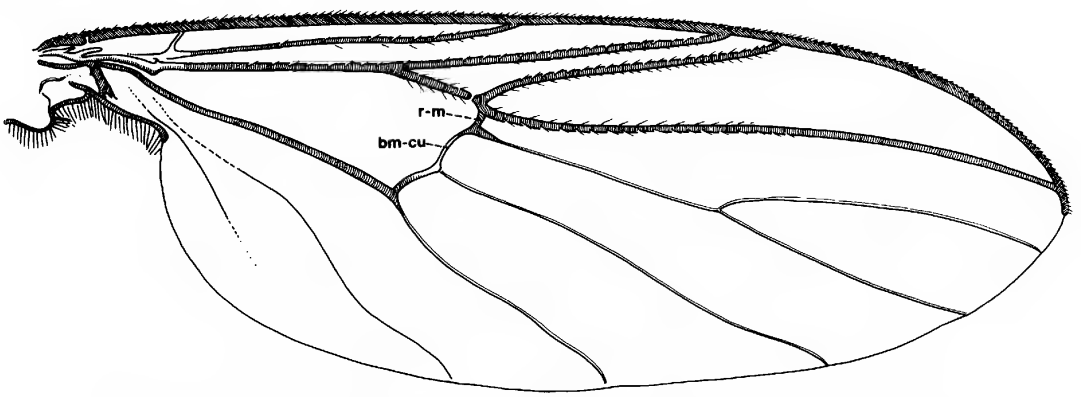
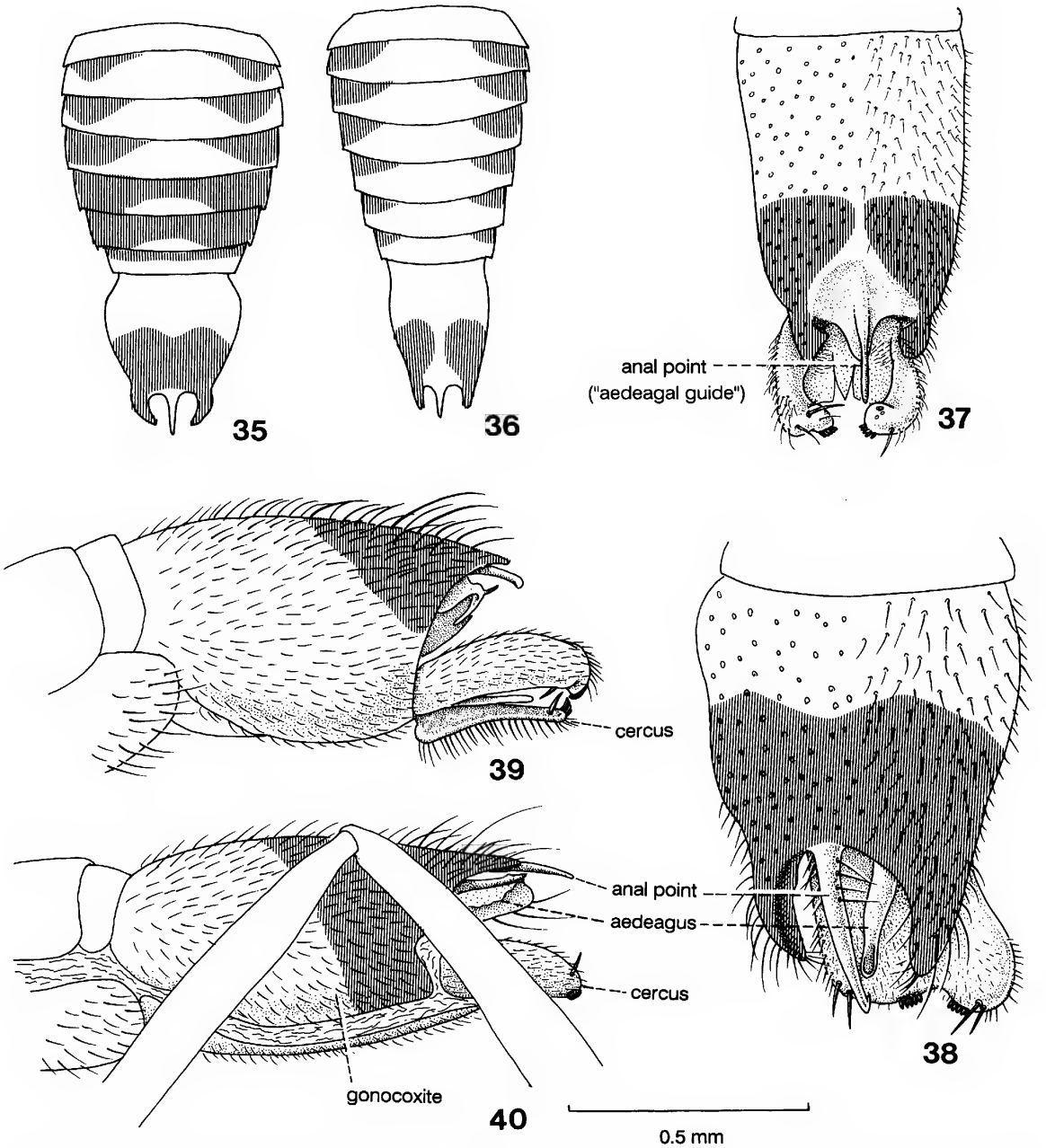


Fig. 34. Wing, *Mycetobia cryptambra,* female paratype, AMNH 11311.



Figs. 35–40. Abdominal and genitalic comparisons between holotype males of *Mycetobia antillea* (AMNH DR-2-13) and *M. cryptambra* (AMNH 11777). 35, 36. Dorsal views (schematic) of: **35.** *antillea,* and **36.** *cryptambra.* **37.** Dorsal view of genitalia, *M. cryptambra.* **38.** Dorsal view of genitalia, *M. antillea.* **39.** Lateral view of genitalia, *M. cryptambra.* **40.** Lateral view of genitalia, *M. antillea.*

Legs light brown. Midtibia with row of four stout, short, black setae on outer surface. Apical tibial spurs light, about equal in length, slightly longer than apical width of tibia. Hind femur and tibia each with dark brown, diffuse apical band, about ¼ the length of segment. Hind tibia with row of 27–30 black spinules along mesal surface.

Abdomen: Male abdomen with tergite I entirely yellow; tII and III mostly yellow, each with small dark brown lateral patches; tIV–VI each with dark brown band across entire

anterior half; tVII mostly obscured, tIX (epandrium) with apical half entirely dark brown. Cerci yellow. Male genitalia: epandrium (tIX) with lateral margins convergent toward apex, with terminal lobes about ⅓ length of epandrium. Lobes narrow to apical point, bear about six long setae, four on mesal surface. Anal point (aedeagal guide) well developed, extended beyond epandrial lobes by about ½ their length and almost to apex of cercus. Median membranous lobe protruding to same level as apices of epandrial lobes, apex spoon-shaped. Dorsally there is a membranous flap extended between cerci; membrane with depression in apical margin, flanked by row of five to six tiny, blunt black setulae. Membrane lightly covered with fine, sparse setulae. Apical lateral corners of membrane, near cercus, with two spinelike setae.

Female with mesonotum slightly lighter than in holotype male; postnotum yellow. All tergites, including tVIII, light brown with thin yellow band across posterior margin. Terminalia very similar to *Mycetobia cryptambra,* also from Dominican amber.

MEASUREMENTS: See table 3.

HOLOTYPE: Male, no. AMNH DR-2-13. The specimen is entirely complete, although some details are obscured by repose of particular parts or the extensive internal fractures in the piece. Presumably from mines surrounding the Santiago area; more specific provenance unknown.

PARATYPE: Female, no. AMNH DR-11. A nearly complete specimen but with most of the left antenna and forelegs missing. Specific provenance within the Dominican Republic unknown.

ETYMOLOGY: In reference to the Greater Antilles. *Mycetobia limanda* Stone is the only known living Antillean member of the genus and is known from the island of Dominica, BWI, Lesser Antilles.

Mycetobia cryptambra, new species

Figures 30, 31, 34, 36, 37, 39, 41

DIAGNOSIS: *Male:* Distinguished from *M. antillea* by the following. Entire pleuron light yellowish. Pronotum with lateral lobes bearing two rows of long setae, most pointed forward. With four pairs long prescutellar dorsocentral setae. One pair postalar setae on each callus; median postalar seta twice the length of lateral one. Mesonotum tan, with diffuse dark spot just anterior to scutellum. Scutellum dark brown; postnotum mostly yellowish, with light brown band on posterior margin. Fork of M_1 and M_2 slightly shorter than length of stem of M. Midtibia with row of six (not four) short, stout, black setae on outer surface in holotype male. Holotype with anterolateral corners of tergites II–VII brown; entire median portion of abdomen light. Anal point (aedeagal guide) extended to ½ the length of cercus. Epandrium with posterior half of dorsal surface dark brown; lateral surface with only posterodorsal corner dark brown (coloration extended only halfway to ventral margin). Intercercal flap of membrane bisected, with median point; bears one (not two) spinelike setae in apical lateral corner where membrane is attached to cercus. Two tufts of fine setulae on slightly raised areas of membrane, one near base of each cercus.

Female: Mesonotum and postnotum entirely yellow, scutellum dark. Tergites II–VII with lateral surfaces brown; middle half of tergites light. Hypogynal valve with slightly indented posterior margin, lateral lobes of each with pair of straight, thin setae. Cerci flat, length about 2.5 times greatest width. Cerci, hypogynal valve, tergite VIII yellow.

MEASUREMENTS: See table 3.

HOLOTYPE: Male, no. AMNH 11777. Specimen is entirely complete, with the left lateral

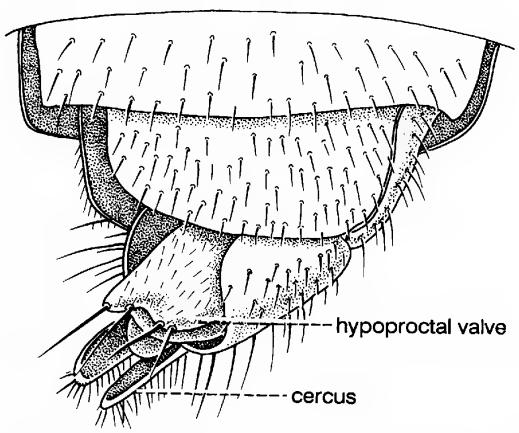
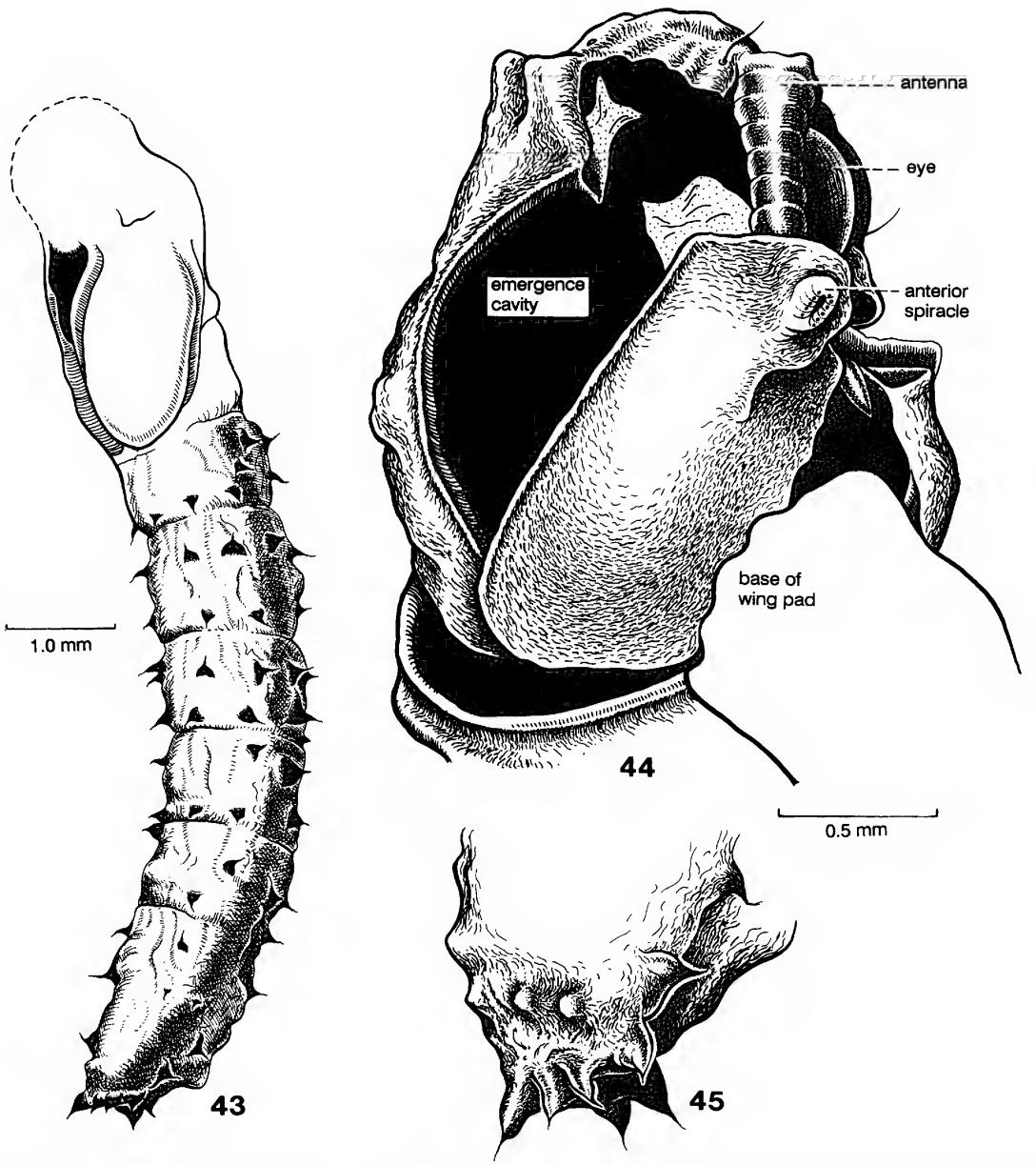


Fig. 41. Detail of ventral view of abdominal apex, *Mycetobia cryptambra,* female paratype, AMNH 11311.

Fig. 42. Specimen W-DR-65, showing two pupal exuviae and (teneral?) adult of *Mycetobia* sp. Pupa A is the one to the left.



Figs. 43–45. Pupal details from specimen AMNH W-DR-65. **43.** Pupa A (head is partially obscured). **44.** Anterior end of pupa B. **45.** Posterior end, detail, of pupa A.

surface least obscured by fractures. Specific provenance within the Dominican Republic is unknown.

PARATYPE: Female, no. AMNH 11311. From the La Toca mine, Santiago Province. This mine apparently has the oldest amber in the country (Lambert et al., 1985).

ETYMOLOGY: This name refers to the subtle, yet distinct, morphological differentiation between this and the other Dominican amber species.

Mycetobia sp.
Figures 42–45

Specimen AMNH W-DR-65 contains two pupal exuviae and a (newly emerged?) female, but the adult female cannot be placed to species with any certainty. Important aspects of the coloration of the mesonotum and abdominal tergites are obscured by flow lines and fungal hyphae. All other morphological features are suggestive of either *M. cryptambra* or *antillea.* It is very likely that the female emerged from the pupa on which her legs rest; the crumpling and apparent softness of some cuticle are suggestive of her having been teneral. The female is oriented with the head towards the posterior end of the pupa on which she rests. The piece is comparatively soft in relation to the pieces of amber with fossilized *Mycetobia.* It is easily scratched, melts from the heat of cutting, and is light, clear yellow, which indicates that it is considerably younger in origin than the other pieces. It is possible that this piece came from Cotui, which has consistently yielded the youngest amber in the Dominican Republic.

Both of the pupal exuviae are oriented in the same direction.

DESCRIPTION: Head with pair of setae on vertex. Anterior spiracles very short, with two rows of five to six spiracular openings bordering the median slit. Wing pads extended to anterior margin of abdominal segment 2. Flat, scalelike spines (2-segmented) on segments II–IX, forming two complete, transverse rows each on segments II–VII. Segment II lacking anterior row of spines on ventral surface. Segments IV and VII with anterior and/or posterior rows of spines reduced in number and size. One transverse row of tiny, retrorse hooks on dorsal surfaces of segments II–VII, in line with posterior row of spines. Segments VIII and IX not clearly segmented. Terminal portion of abdomen with subapical pair of small "warts." Pair of apical spines bordered by pair of paramedian spines; pair of slightly larger spines anterolaterad and one pair dorsoapicad. Total lengths of pupae 8.87 and 9.55 mm.

The pupae of three species of *Mycetobia* have been described: *M. pallipes* (Keilin and Tate, 1940), *M. divergens* (Peterson, 1981), and *M. stonei* (Lane and d'Andretta, 1958). The amber pupae agree in all diagnostic features with those of living species.

DISCUSSION: There are 15 world species of *Mycetobia,* including an unidentified one from Ethiopa (Hutson, 1980), *cinctipes* de Meijere (Java), *intermedia* Edwards (Borneo), and three recently described by Baylac and Matile (1988; 1990) from New Caledonia: *neocaledonica, scutellaris,* and *seguyi.* There are three described from the New World: *divergens* Walker (Nearctic), *stonei* Lane and d'Andretta (Costa Rica), *limanda* Stone (Dominica, BWI). Seven species occur in the Palearctic Region (Mamaev and Krivosheina, 1988). These flies are not well represented in museum collections, so conclusions of biogeography must await more thorough sampling efforts.

Both Dominican amber species are more similar to Neotropical species than to any others. This is based on the long setae ventrally and dorsally on the subcostal wing vein. Coloration, however, is distinctly different from the Neotropical species *M. stonei* and *M. limanda.* Unfortunately, Stone (1966) did not illustrate the male genitalia of *limanda,* and Lane and d'Andretta (1958) described *stonei* only from two females (the male is as yet undescribed or undiscovered). The male genitalia that are described in detail and figured are the two New Caledonian species (Bayloc and Matile, 1988), *M. divergens* (Peterson, 1981), and five Palearctic species (Mamaev, 1968). The amber fossil species share more genitalic features with *divergens* than with all these other species, and it is quite likely that all the New World *Mycetobia,* living and fossil, form one clade.

GENUS *MESOCHRIA* ENDERLEIN

Mesochria Enderlein, 1910: 65.
Type species: *M. scottiana* Enderlein, 1910: 65.

Mesochria neotropica, new species
Figures 29, 32, 46

DIAGNOSIS: Mesonotum yellow with two dark black-brown lateral vittae; katepisternum, postnotum, and posterior surface of postalar callus dark brown. Wing: costal vein extended midway between apices of R_{4+5} and M_1. Veins R_1 and R_{2+3} convergent, contiguous apically for a length about three times their width; no thickening or coalescence of these veins. Anal veins absent.

DESCRIPTION: *Head:* Antenna apparently dark brown, but only basal six segments preserved. Proboscis and palpus dark brown. Face short, height about ⅓ that of head. Eye bare; dorsal margins separated by a distance about equal to diameter of ocellus. Numerous fine, long, light setae on gena. Ocelli on raised, dark brown triangle; lateral ocelli touching eye margins. Postocciput dark brown.

Thorax: Mesonotum yellow, with two distinct dark brown vittae converged posteriad, forming a "U". Short, dark brown supra-alar vittae just ventral to these. Katepisternum and postnotum dark brown. Postalar callus with smooth, slightly concave, dark brown posterior surface. Scutellum mostly dark brown, except for median yellow area. Mesonotal setae light yellow, acrostichals randomly arranged. Lateropronotal lobe with row of seven to eight setae on lateral edge. Two supra-alars; one pair setae just anterior to postalar callus; three pairs prescutellar dorsocentrals; one pair apical scutellars, another pair anterolaterad, on disc of scutellum. Foreleg entirely yellow. Midtibia with diffuse brown band from ½ to ⅘ along proximal length. Hindtibia with more narrow band in same region. Other portions of leg segments yellow. Mid and hind tarsomere 1 with two rows of about 30 spinules on adaxial surface; distal tarsomeres each with a pair of apical spinules. Fore, mid, and hind tibiae with single large apical spur, no smaller one; row of evenly spaced and equal length setae on adaxial surface of distal end of tibia, forming a comb.

Halter yellow, with small ventral, membranous flap at base of stalk. Wing hyaline, with dense covering of microtrichia on membrane, no macrotrichia. Costa with two rows of microtrichia along entire length; costal vein ended midway between apices of R_{4+5} and M_1. Sc and humeral crossvein thin, faint; ending in C slightly proximal to base of radius. Veins R_1 and R_{2+3} convergent, contiguous apically for a length about three times their width; no thickening or coalescence of these veins. Median fork slightly shorter than basal stem. CuA_1 not reaching wing margin. A_1 present as fold only. No fold present along middle of basal cell. Crossvein r-cu in base of basal cell complete, in line with humeral crossvein. C, radial, R_s, CuA_2, and r-m and cu crossveins, thick and dark. Medial veins, CuA_1, and crossvein bm-cu thin, light. Setulae along length of R_1, R_{2+3}, R_{4+5}, and basal portion of Cu.

Abdomen: Tergite I yellow; tergites II–V with median yellow area, lateral portions light brown. Tergites VI–VIII entirely brown. Cerci short, yellow.

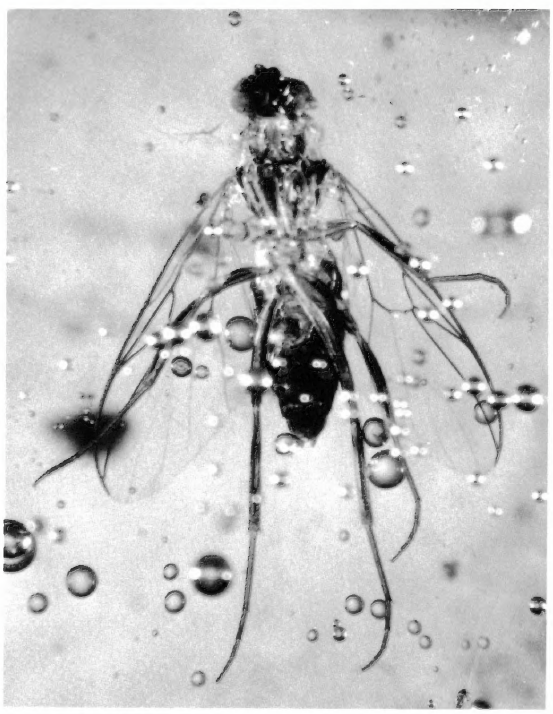


Fig. 46. Ventral view of *Mesochria neotropica,* female holotype, AMNH DR-5-15.

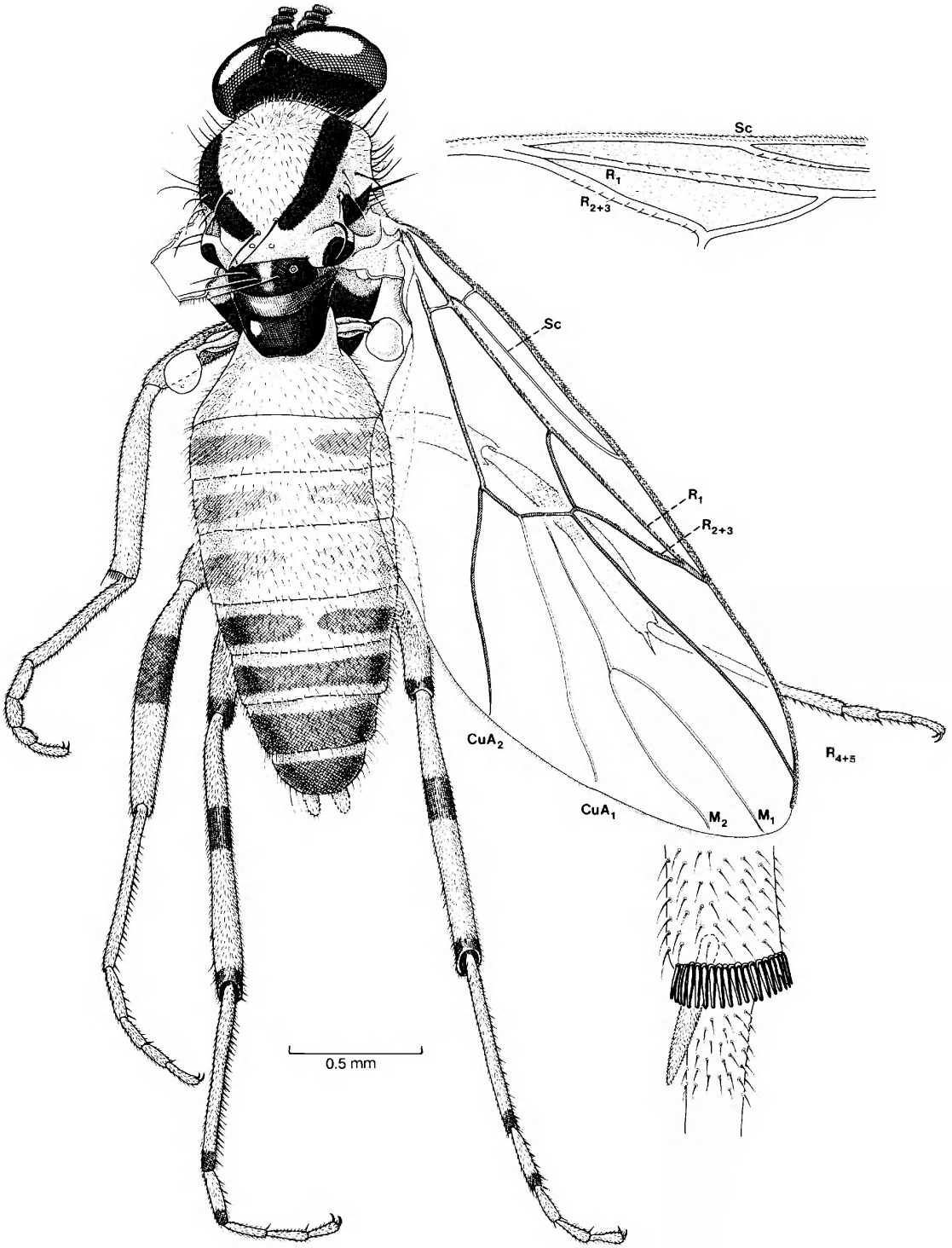


Fig. 47. *Mesochria neotropica,* female holotype dorsal habitus, with details of left wing (upper right) and midtibial spur (lower right). Left wing omitted from habitus drawing.

Male unknown.

MEASUREMENTS: See table 3.

HOLOTYPE: Female, and only known specimen, AMNH no. DR-5-15, from mines in vicinity of El Valle, Dominican Republic. The specimen is beautifully preserved, missing only the distal portions of the antennae, and the portion of the right foreleg distal to the trochanter.

ETYMOLOGY: In reference to the only known Neotropical member in this monophyletic group.

DISCUSSION: There are seven described species of *Mesochria*: four from Africa, *M. scottiana* Enderlein from the Seychelles, *M. buxtoniana* Edwards from western Samoa, and *M. intermedia* Edwards from Borneo. There are probably new species and records that will fill out this distribution. The genus has not been reported from Australia, despite the attention that fauna has received by Colless and other dipterists. The apparent absence of the genus from the New World is most likely not due to insufficient sampling.

The important diagnostic features that the amber species shares with living *Mesochria* are the tuberculate ocellar area, the flat head, and apical joining of veins R_1 and R_{2+3}. The amber fossil species shares most of its features with *M. intermedia*: the costa is extended nearly halfway between R_{4+5} and M_1 (apomorphically); R_{2+3} ends in R_1 as usual, but it is not swollen apically (this is plesiomorphic at the level of the genus); R_{4+5} is only moderately curved, and the median fork is complete with the lower branch slightly shorter than the stem (also plesiomorphic). Given these plesiomorphic features, *M. intermedia* would be the living sister group to other, living *Mesochria*. Even in *M. intermedia* the eyes are dorsally contiguous in both sexes, but in the single female specimen in Dominican amber, the eyes are close but not contiguous. On this basis, the amber species is the sister group to the remaining members of *Mesochria*. The amber species also is an intermediate between *Mesochria* and *Mycetobia*, thus illustrating the paraphyletic nature of *Mycetobia* with respect to *Mesochria*. *Mesochria* are simply highly modified *Mycetobia* and this genus should, in a revision of the world species, be synonymized with the latter.

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